

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* SRINATH HOSUR, ALAN GATHERER,  
and EKO N. ONGGOSANUSI

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Appeal 2007-3960  
Application 09/659,431  
Technology Center 2600

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Decided: April 29, 2008

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Before MAHSHID D. SAADAT, JOHN A. JEFFERY, and MARC S. HOFF, *Administrative Patent Judges*.

JEFFERY, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from the Examiner's rejection of claims 1 and 2. Claims 3-9 have been indicated as containing

allowable subject matter (App. Br. 2). We have jurisdiction under 35 U.S.C. § 6(b).

Claims 1 and 2 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Sullivan (U.S. Patent 5,999,131, issued Dec. 7, 1999).

We AFFIRM.

Appellants invented a method to combine multiple paths of a received signal. The process includes the steps of forming a matrix of covariances of the multipath inputs received by an antenna and finding an eigenvector of the matrix. The inputs are weighted according to a component of the eigenvector and combined. These steps make the method robust.<sup>1</sup>

Rather than repeat the arguments of Appellants or the Examiner, we refer to the Brief<sup>2</sup> and the Answer<sup>3</sup> for their respective details. In this decision, we have considered only those arguments actually made by Appellants. Arguments, which Appellants could have made but did not make in the Brief, have not been considered and are deemed to be waived. See 37 C.F.R. § 41.37(c)(1)(vii).

Appellants argue claims 1 and 2 as a group (App. Br. 2-3). We, therefore, select representative claim 1 to decide the appeal. 37 C.F.R. § 41.37(c)(1)(vii). Accordingly, the remaining claim stands or falls with claim 1.

Claim 1 reads as follows:

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<sup>1</sup> See generally Spec.3:6-11; 4:6-8; and 6:16-10:14.

<sup>2</sup> We refer to the Appeal Brief filed April 10, 2006, throughout this opinion.

<sup>3</sup> We refer to the Examiner Answer mailed June 28, 2006, throughout this opinion.

1. A method of multipath combining, comprising:

- (a) forming at least one matrix of covariances of multipath inputs from a single receiver antenna;
- (b) finding an eigenvector of said matrix; and
- (c) combining said multipath inputs relatively weighted according to the components of said eigenvector.

ISSUE

The issue is whether Sullivan discloses a single receiver antenna as recited in claim 1.

FINDINGS OF FACT

The record supports the following findings of fact by a preponderance of the evidence.

1. Claim 1 recites the step of “forming at least one matrix of covariances of multipath inputs from a single receiver antenna[.]”
2. Sullivan discloses the step of forming a matrix of covariances of multipath inputs from an antenna element (col. 5, ll. 41-49 and col. 6, ll. 6-15; Ans. 3).
3. Concerning the antenna element 22, Sullivan discloses that “a single element can be used, or an array can be used which includes several antenna elements 22” (col. 5, ll. 58-60; *See Ans. 3*).

4. Sullivan discloses the steps of finding an eigenvector of the matrix and combining the multipath inputs relatively weighted according to the components of the eigenvector recited in claim 1 (col. 5, ll. 41-49 and col. 6, ll. 6-21; Ans. 3). Appellants have not disputed that Sullivan discloses these limitations.

#### PRINCIPLES OF LAW

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).

#### ANALYSIS

In essence, the dispositive issue in this appeal turns on whether Sullivan discloses the use of a single antenna as recited in claim 1. Appellants argue that the antenna element in Sullivan is actually multiple antennas (22a-c) as shown in Figure 2 (App. Br. 3). The Examiner disagrees and cites to Sullivan’s disclosure that the antenna can be either a single element or an array with several antenna elements (Ans. 3, 5). We agree with the Examiner.

Sullivan discloses the step of forming a matrix of covariances of multipath inputs from an antenna element (FF2). Regarding the antenna element, Sullivan describes the antenna element 22 that receives the multipath inputs of the signal as either: (a) a single element or (b) an array of

several antenna elements (FF 3). This disclosure clearly contemplates two distinct options for the antenna: (1) a single element or (2) an array including several antenna elements. Indeed, an interpretation that the disclosed antenna element as a single element is, in actuality, multiple antennas distorts the plain meaning in Sullivan. As the Examiner additionally notes, Sullivan claims a single receiver antenna by reciting the limitation, “at least one antenna,” in claim 1 (Sullivan, col. 7, ll. 40-41; *See Ans. 5*). Based on the above evidence, we find Sullivan discloses a single receiver antenna as claimed.

Appellants also argue that the beamformer in Sullivan “must have more than one antenna input/output in order to form a beam or to make directional detection as in column 5, lines 46-49 . . . That is, the detection and ranging in Sullivan cannot work with only a single antenna” (App. Br. 3). The Examiner acknowledges that the beamformer may need more than one input or output, but disagrees that this translates into requiring multiple antennas (Ans. 6). In response to Appellants’ challenge regarding the sufficiency of Sullivan’s disclosure noted above, the Examiner refers to Sexton (U.S. Patent No. 5,937,333, issued Aug. 10, 1999) as extrinsic evidence establishing that the single receiver antenna of Sullivan can perform beamforming operations (Ans. 6).

Sullivan discloses that multipath components (e.g., 20a, 20a’, and 20a”) of the signal are used by the beamformer (Sullivan, col. 5, ll. 27-31 and 46-49). As stated previously, Sullivan further discloses that these components can be received by a single receiver antenna (Sullivan, col. 5, ll.

58-59). There is, therefore, nothing in Sullivan that precludes a single receiver antenna from beamforming. Moreover, Sexton illustrates that beamforming can be performed through the use of a single receiver antenna 118 (Sexton, col. 2, ll. 3-6 and 26-30, col. 3, ll. 32-34). While the antenna 118 may be constructed from several omni-directional components (Sexton, col. 4, ll. 7-22), together these parts form a single receiver antenna. We therefore find that Sullivan amply discloses a single receiver antenna as recited in claim 1.

#### CONCLUSION

For the foregoing reasons, Appellants have not shown error in the Examiner's anticipation rejection of representative claim 1 based on Sullivan. Accordingly, we will sustain the Examiner's rejection of claim 1, as well as claim 2 which falls with claim 1.

#### DECISION

The decision of the Examiner rejecting claims 1 and 2 is affirmed.

No period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

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AFFIRMED

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